Predicting Infant Mortality

It has been shown that there is a definite association between Apgar score, birth weight, and mortality. To compare the ability of Apgar score, birth weight, and maternal risk factors to predict outcome (i.e., death or survival), discriminant analysis (13, 14) was applied to two study groups:

(a) neonatal survivors versus neonatal deaths, and
(b) postneonatal survivors versus postneonatal deaths.

Because of the large number of live births (250,670), only a sample of the newborns surviving the specified time periods was used for the two survivor groups. However, all newborns dying in the neonatal period (2,630) or in the postneonatal period (1,094) were used in these analyses.

With respect to neonatal deaths versus survivors, results indicate that either Apgar score or birth weight alone predicts mortality about the same as the other and that each is a better predictor than the maternal risk factors. The maternal risk factors themselves are not very useful variables on which to discriminate between death and survival (18). When both Apgar score and birth weight were used together in the discriminant models, Apgar scores were shown to add substantially to the ability to predict outcome, over and above the prediction based only on birth weight.

The analysis of postneonatal deaths versus survivors revealed that neither Apgar score nor any other variable on the birth certificate was useful in predicting outcome.

SUMMARY

This study examines the one-year survival experience of N.C. residents born in 1978-80. As supported in other studies, there are definite associations among mortality, Apgar score, and birth weight. The greatest risks of mortality occurred among infants with a low birth weight and/or low Apgar score, irrespective of the age at death. For the birth weights over 1500 grams, infants with a score of 9-10 had a greater chance of dying in the postneonatal than the neonatal period.

Discriminant analysis was employed in this study to compare the abilities of Apgar score, birth weight, and other birth characteristics to discriminate between survival and death. The study shows that when discriminating between neonatal death and neonatal survival, Apgar score adds to our ability to predict outcome, especially when used in conjunction with birth weight. Further, both variables, singularly or in combination with other variables, are much better predictors of mortality than the maternal risk factors available before birth.

However, when discriminating between postneonatal death and survival, neither Apgar score, birth weight, nor any other characteristic on the birth certificate is very useful in predicting mortality. This result may be due in part to the fact that the distribution of Apgar scores for the postneonatal death group was very similar to that for the survivor group, making discrimination on this variable difficult. Because none of the postneonatal models predicted outcome well, variables other than those on the birth certificate are undoubtedly needed. These results emphasize the difficulty of identifying at birth children at high risk of dying during the postneonatal period.

This report summarizes a more detailed report by the State Center for Health Statistics. Copies of the original report are available upon request.